REMARKS

Claims 1, 3-13 and 15-19 are pending. Claims 1, 3, 5, 7, 10 and 15-18 are amended, claim 13 is canceled herein without prejudice, and claim 20 is added. No new matter has been added by virtue of these amendments; support therefore can be found in throughout the specification and original claims as filed (see, e.g. [0040-0041] of Published Application No. 2002/0177771).

Any cancellation of the claims should in no way be construed as acquiescence to any of the Examiner's rejections and was done solely to expedite the prosecution of the application. Applicant reserves the right to pursue the claims as originally filed in this or a separate application(s). Favorable reconsideration in light of the remarks which follow is respectfully requested.

1. Claim Objections

Claims 3-15 and 15-18 are objected to as depending from a canceled claim. The claims have been amended to correct the claim dependency, as requested.

2. 35 U.S.C. §103 Rejections

Boernert and Haishi

Claims 1, 3, 5, 7-13 and 17-19 are rejected under 35 U.S.C. §103(a) over Boernert (US 6,317,619) and the Haishi publication. Applicants respectfully traverse. However, without agreeing with or acquiescing to the rejections, Applicants have amended the claims so as to clarify the term "low latency".

The Office acknowledges that Boernert does not teach production of a three-dimensional rendering of a volume in real time.

Rather, according to Boernert a moveable RF coil holder is positioned in proximity to the object of interest and nuclear magnetization is excited in a thin, substantially 1D, cylindrical volume with a longitudinal axis substantially perpendicular

to a plane of the RF receiving coil holder and a reconstructed linear image is displayed, possibly side-by-side along with previous linear images (see col. 4, lines 1-12; col. 15, lines 37-51). Alternatively, a 2-D image is provided by scanning the moveable RF coil across the patient (see col. 4, lines 1-12; col. 15, lines 55-56).

Thus, Boernert only describes a system and method that makes it possible to provide a linear 1-D images or 2-D images. Boernert further doesn't teach or suggest anything with respect to the rate of frames per second that can be displayed or the latency provided, nor does Boernert appear to be concerned with these features. Further, any rate of frames per second or latency provided by Boernert's system and method would only be applicable to a linear 1-D or 2-D image display and, thus, would not correlate to that which could be obtained when providing a 3-D image rendering.

Applicants respectfully disagree with the Office's assertion with respect to Boernert that "although the reference does not explicitly discuss the frame rate or latency, both features are inherent to the reference image display, and since 'about' and 'low' are so subjective, such inherent features are interpreted to meet the claim". Boernert does not teach or suggest a system or method for 3-D rendering nor is Boernert's system or method capable of such a rendering and, thus, Boernert's system and method cannot inherently provide Applicants' claimed latency and frame rate for producing a 3-D image rendering. Applicants note that the term "low" has been replaced with equal to or less than about one third of a second. With respect to the term "about", it is submitted that greater than about 10 and equal to or less than about one third are not subjective terms but, rather, could be clearly assessed – these ranges are not explicitly taught or suggested by Boernert's system and method.

Further, it is well-established that in order for a reference to inherently disclose a feature not expressly disclosed, extrinsic evidence can be used to supply the missing feature only if the extrinsic evidence "make[s] clear that the missing descriptive matter is **<u>necessarily present</u>** in the thing described in the reference and that it would be so

recognized by persons of ordinary skill in the art. **Inherency, however, may not be established by probabilities or possibilities**." MPEP 2112(IV), citing *In re Robertson*, 169 F.3d 743, 745 (Fed. Cir. 1999) (citations omitted) (emphasis added).

There is absolutely nothing that makes it clear that Boernert's systems or methods, which are different than those of Applicants', would <u>necessarily</u> provide a 3-D image rendering in accordance with Applicants' frame display rate or latency. Thus, inherency has not been established.

Further, with respect to Applicants' claim language "wherein collecting MRI data, and transferring MRI data is performed continuously", the Office points to Boernert at col. 16, lines 5-8 which states:

> In another alternative, a 2D slice image, or multiple 2D slice images, are obtained of slices with a selected 3D position and 3D orientation with respect to the moveable RF coil. Preferably, these slices are within the spatial sensitivity profile of this coil so that the RF pulses can be transmitted to and MR imaging signals can be received from theses slices with the moveable RF coil; more preferably these slices are parallel to the current 3D plane of the RF coil.

However, it is respectfully submitted that this passage of Boernert does not teach or suggest continuous collection and transfer of MRI data. All that is provided is that a single or multiple 2D slice images can be obtained.

The Office points to Haishi as allegedly describing real-time reconstruction of a 3D MR image and alleges that Boernert's system and method could be modified in view of Haishi so as to provide Applicants' claimed method and apparatus. Applicants respectfully disagree.

While Haishi uses terms like "real-time", "rapid image sequence", which Applicants' state in the claims as meeting a certain criteria of high frame rate and low latency, Haishi provides one example in which the image reconstruction time was 1.5 s

and the data transfer time between PCs was about 0.5 s. Thus, at most, Haishi provides a system and method that is only capable of providing a latency that is at least 2.0 s (for the 0.5 seconds to transfer of data from PC-1 Reconstructor to PC-II Image Processor, plus the 1.5 seconds for image reconstruction), which is <u>not</u> within Applicants' claimed range of equal to or less than about one third of a second. Further, according to Haishi in connection with Fig. 3 in which four consecutive volume renderings were provided, the time intervals between each image was 8.04 s. Thus, at most, Haishi's method is only capable of one frame in over 8 seconds (or 0.125 frame per second) which is <u>not</u> within Applicants' claimed range of 10 or more frames per second.

Further, it is submitted that Haishi, either alone or in view of Boernert, fails to teach or suggest a method or apparatus wherein volume renderings can be updated after partial acquisition of image data, and that Haishi's method and apparatus would not be capable of achieving Applicants' claimed frame rate or latency even if modified as proposed by the Office.

Applicants further submit that even if Boernert and Haishi were combined, Applicants' claimed method and apparatus still would not be taught or suggested. As noted, Boernert's system and method is only capable of linear 1D reconstruction or 2D reconstruction and doesn't teach or suggest anything with respect to a method or apparatus which can provide a 3-D image rendering with the claimed latency and frame speed. While Haishi describes 3-D imaging of a phantom moving downward in water, Haishi does not teach or suggest Applicants' claimed latency and frame speed nor how such values could even be obtained and, thus, even if Boernert and Haishi were combined, each and every element of Applicants' claims still would not be taught or suggested.

In view thereof, claims 1, 19 and 20 are patentable over Boernert and Haishi. Claims 3, 5-7, 7-12 and 17-18 depend from claim 1 and, thus, also are patentable over

Boernert and Haishi.   Reconsideration and withdrawal of the rejections is respectfully requested.

Boernert, Haishi and NessAiver

Claims 4 and 6 are rejected under 35 U.S.C. §103(a) over Boernert, Haishi and NessAiver (US 5,329,925). Applicants respectdully traverse.

As set out above, Boernert and Haishi fail to teach or suggest Applicants' method and apparatus. NessAiver is cited for allegedly describing the performance of view sharing between even and odd echoes in order to combat DC artifacts. Without agreeing or acquiescing to this allegation, Applicants submit that even if Boernert and Haishi were further combined with NessAiver as proposed, Applicants' claimed method and apparatus would not be taught or suggested. In particular, NessAiver fails to remedy the above-noted deficiencies in Boernert and Haishi. Thus, even if Boernert, Haishi and NessAiver were combined, each and every element of Applicants' claims still would not be taught or suggested.

In view thereof, claims 4 and 6 are patentable over Boernert, Haishi and NessAiver. Reconsideration and withdrawal of the rejections is respectfully requested.

Boernert, Haishi and Pfister

Claim 15 is rejected under 35 U.S.C. §103(a) over Boernert, Haishi and the Pfister publication. Applicants respectfully traverse.

As set out above, Boernert and Haishi fail to teach or suggest Applicants' method and apparatus. Pfister is cited for allegedly describing real-time frame rates and alpha blending. Without agreeing or acquiescing to this allegation, Applicants submit that even if Boernert and Haishi were further combined with Pfister as proposed, Applicants' claimed method and apparatus would not be taught or suggested. In particular, Pfister fails to remedy the above-noted deficiencies in Boernert and Haishi. Thus, even if

Boernert, Haishi and Pfister were combined, each and every element of Applicants' claims still would not be taught or suggested.

In view thereof, claim 15 is patentable over Boernert, Haishi and Pfister. Reconsideration and withdrawal of the rejections is respectfully requested.

Boernert, Haishi and Deering

Claims 15 and 16 are rejected under 35 U.S.C. §103(a) over Boernert, Haishi and Deering (US 6,417,861). Applicants respectfully traverse.

As set out above, Boernert and Haishi fail to teach or suggest Applicants' method and apparatus. Deering is cited for allegedly describing the use of alpha blending and MIP mapping for increasing realism of reconstructed images.

Without agreeing or acquiescing to this allegation, Applicants submit that even if Boernert and Haishi were further combined with Deering as proposed, Applicants' claimed method and apparatus would not be taught or suggested. In particular, Deering fails to remedy the above-noted deficiencies in Boernert and Haishi. Thus, even if Boernert, Haishi and Deering were combined, each and every element of Applicants' claims still would not be taught or suggested.

In view thereof, claims 15 and 16 are patentable over Boernert, Haishi and Deering. Reconsideration and withdrawal of the rejections is respectfully requested.

CONCLUSION

It is respectfully submitted that the subject application is in a condition for allowance. Early and favorable action is requested. If for any reason a fee is required, a fee paid is inadequate or credit is owed for any excess fee paid, you are hereby authorized and requested to charge Deposit Account No. 04-1105 under Order No. 84847(47992).

Dated: <u>March 14, 2011</u>

Customer No.: 21874

Respectfully submitted,

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